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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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David L. Hagen

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EXAMINER

SOOHOO, TONY GLEN

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

07/10/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/686,191	<b>Applicant(s)</b> HAGEN ET AL.	
	<b>Examiner</b> Tony G. Soohoo	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 56-99 is/are pending in the application.
- 4a) Of the above claim(s) 60-64 and 84-95 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 56-59, 65-83 and 96-100 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 and 13 April 2009 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 60-62; 63-64, and 84-95 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a provisionally non-elected species or an invention non-elected without traverse, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/13/2007.
2. The elected species was elected to species b2 the use of a high voltage power supply.

### ***Drawings***

3. The replacement drawings were received on 4/13/2009. These drawings are approved
4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of must be identified and labeled in the drawings
  - a. The “non-uniform quadrality”
  - b. The “at least four differing regions”
  - c. The excluded first or second orthogonal directions transverse to the mean streamwise flow
  - d. The direction of the mean streamwise flow

These must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 56-59, 65-83, 96-100 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The original specification fails to support "the means stream wise flow" and the exclusionary scope of placement of orifice orientation to be "excluding a first or second orthogonal directions transverse to the mean streamwise flow".

The specification as originally filed, fails to support the recitation of "a non-uniform distribution *comprising* at least a *non-uniform quadrality* having ***at least four differing regions*** along the curvilinear path along the ***contractor*** surface (emphasis added)".

It is noted applicant's allegation of "no new matter", "and "is fully supported throughout the original specification as filed" in the remarks on page 17 filed 4/13/2009:

Applicant amends claim 56 above to more clearly define the claimed structure. As amended, claim 56 recites "the ~~non-uniform fluid~~ distribution being taken ~~in at least four differing regions at a plurality of locations~~ along a curvilinear path transverse to the second flow, or streamwise along the second flow direction, respectively". This amendment is fully supported through the original specification as filed, and no new matter has been added.

Does not

specifically point out basis such language in the original specification, as to particular page and line number supporting the subject matter.

***Claim interpretation***

7. The independent claim 56 states in the line 17 “***are configured to deliver*** at least one of .... a prescribed non-uniform [transverse/ streamwise] distribution of [fluids/ or fluid ratio]... .” Whereby the “configured to deliver at least one of a prescribed non-uniform ... distribution” is directed, in an operative sense, to the an effect of the non-uniform location, size ,density and orientation of the orifices, and such flow effect of the 1<sup>st</sup> fluid relative to the 2<sup>nd</sup> fluid is a dependent effect in response to the two types of fluids, pressures, and temperature effects used in the process performed by the apparatus as it is passed through the orifices, it is understood and considered by the examiner that any provision of a **non-uniform orifice** location/size/orientation distribution on a curvilinear transverse direction of an injector tube surface would inherently provide the recited prescribed manner of operation to the fluids as recited by the claim (see clause reciting “a prescribed [flow] distribution”).
8. The term “quadrality” is unstandard and is read as referring to the numeral or enumeration of “four”.
9. In claim 56, “contractor surface” is read as “contactor surface”.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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11. Claims 56-59, 70-76, 78-82, and 96-100 are rejected under 35 U.S.C. 102(b) as being anticipated by Woilles et al 4859071.

12. The Woilles et al (et al) reference discloses

- e. a fluid delivery system
- f. a duct 2
- g. an elongated fluid contactor 8, 10, 12, 16, 18, 14
  - i. an inlet 32
  - ii. a plurality of outlet orifices 20, 22, 26 (fig 2) in the elongated fluid contactor

(1) where the orifice distributions, along a 1<sup>st</sup> curvilinear transverse direction along a surface of the contactor is **one of (the choice of in this case)**

(a) **non-uniform spatial location** (see location of 26 compared to 20, 22, fig 1)

(b) non-uniform size

(c) **non uniform orientation** (see arrows fig 2), relative to **one of the choice of:** 1) the axial, 2) radial and 3) circumferential directions of the elongated fluid contactor, excluding a 1<sup>st</sup> or 2<sup>nd</sup> orthogonal directions transverse to the mean streamwise flow;

iii. It is noted that the non-uniform distribution (of a, b, or c) comprises at least a non-uniform quadrality having at least four definable differing

regions along the curvilinear path along the contactor surface having at least four differing regions along the curvilinear path along the “contractor” [sic] surface. (see markup figure with four exemplary regions)

A desired flow distribution of the 1st fluid is provided by a plurality of outlet orifices nozzles, which as seen in figures 1 and 2, by a non-uniform distribution of spatial location and orientation.

The elongated fluid contactor and support 8, 16, 18 is made of a flexible sheet steel tubing, column 5, lines 45-48, and lines 55-56.

The structural of the elongated fluid contactor as shown by the reference is considered capable to function in a desired flow distribution of 1st fluid is provided by a plurality non-uniform spaced orifices 3, and on 5 or 4, in any distribution.

Note that the fluid contactor tube is formed from a conical, curved, thin walled tubular member extending transverse and along parallel in curvature into the flow path of the 2<sup>nd</sup> flow. There is also an elongation section 18 along the path of the pipe 2. Each of the elongation sections have a curvature radii along the length as seen in figs 1 and 2.

With regards to the mass flow rate volumes of flow, the flow rates provided of the 1st and 2nd flows are dependent upon the flow pressures operated by the device and does not distinguish the apparatus in a structural sense.

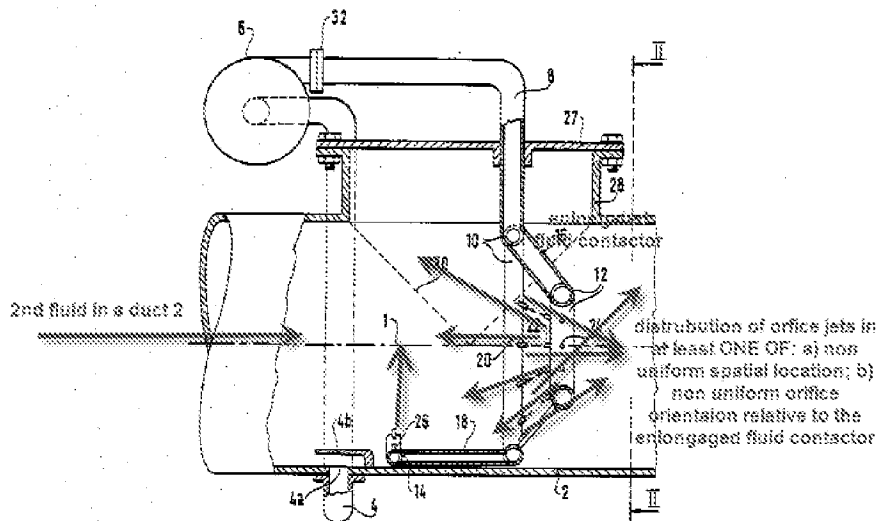


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Regarding the clause "wherein the apparatus orifice distributions are configured to deliver [the operative function] at least one of a [choice of a resultant flow characteristic]... " (see claim 56 and new claims 99-100, "to deliver at least one of a prescribed [distribution of fluid(s)]"), such limitations of "configured to deliver" are directed to the operation of the delivery of the fluids (i.e. method of use of the orifices), however does not structurally limit the orifices to a particular geometry of structure or configuration. "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). "apparatus claims cover what a device *is*, not what a device *does*" (emphasis in original) *Hewlett-Packard v. Bausch & Lomb Inc.* 15 USPQ2d 1525, 1528 (Fed. Cir. 1990)..

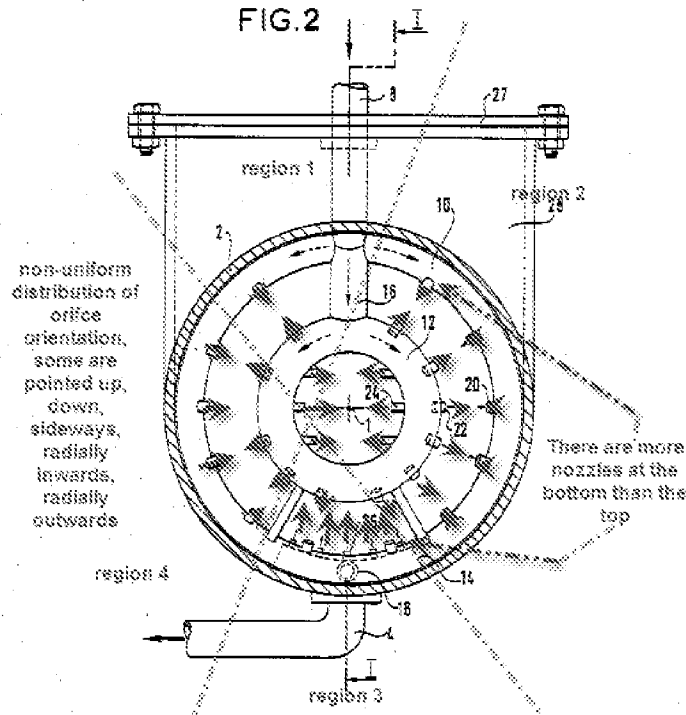
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FIG. 1



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FIG. 2



***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 68-69, 77, and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woilles et al 4859071 .

The Woilles et al 4859071 reference discloses all of the recited subject matter as established above with the exception of 1) the particular numerical value of the area and diameter of the Woilles' orifices (claims 68-69), 2) the orifices being of a non-uniform size distribution (claim 77), 3) the wall with the orifices being of a thinner wall portion than the other parts of the fluid contactor.

Regarding the first issue of the numerical values of orifice area and diameter, It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the area and diameter of the orifices so as to provide an effective ratio portion of material flow into the duct, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding the second issue of the orifices of a non-uniform size distribution, it would have been an obvious matter of design alter the sizes of the nozzles to a non-uniform distribution of sizes so as to optimize the material flow

across the cross section of the duct for a more effective and rapid mixing, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Similarly, regarding the last issue of the contactor wall being thinner in the orifice section than the other portions of the contactor wall, it would have been an obvious matter of design choice to alter the thickness of the steel sheet tubing to be a smaller thickness at the orifice section so as to lower material costs, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

14. Claims 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woilles et al 4859071 in view of Tsouris et al US 2003/0086333 and Paine 3570513.

The Woilles et al 4859071 reference discloses all of the recited subject matter as established above with the exception of the fluid delivery system comprising a high voltage power supply to establish an electric field modifying the flow of the 1st fluid delivered by the orifices.

The phenomenon of electrohydrodynamic (EHD) effect in cooperation in a control of fluid flow is old and well known in the art of fluid control and mixing. This is evidenced by the 1971 patent of Paine, US 3570513 in which high voltage is provided across electrodes for produce an electric field to affect fluid flow as

use as a electrohydrodynamic control valve. Furthermore, the use of (EHD) techniques (and control) has been proposed within a channel flow assisting the mixing of fluids, See Tsouris et al US 2003/0086333. In light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to further provide the fluid delivery system with a high voltage power supply to establish an electric field modifying the flow of the fluid delivered by the orifices of Woilles so as to provide a control of the interaction of the fluids for a more effective mixing interaction.

### ***Response to Arguments***

15. Applicant's arguments filed 4/13/2009 have been fully considered but they are not persuasive.

16. Applicant argues on page 16 of the remarks as to the definition of "non-uniform".

prescribed manner of operation of the fluids as recited by the claim" (p. 2). This observes that any binary change, i.e., presence in one position compared with absence in another, would be "non-uniform". However, Applicant respectfully submits that this view diverges from Applicant's usage of non-uniform distribution in claim 56. It is well established that "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their broadest *reasonable* interpretation." *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir., 1983) (emphasis in original; internal quotations omitted)

In particular, the view adopted by the Office Action would render each and every structure of finite dimension "non-uniform", in the sense that finite injector and orifice apparatus must terminate at some point in space, and have a corresponding absence of that injection structure at a removed location. However, that reading of the claim, i.e., a reading that

17.

18. Applicants remark that the "non-uniform" should be read in light of the specification, however has only provided argument and has to pointed out particularly to the page and line number of applicant's original specification as to a positive statement

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of the definition of "non-uniform". Absent such definition, the term has been read in its broadest reasonable interpretation by the examiner.

19. Applicant further attempts to characterize the Office position. However there can not be found any corresponding quote by the Office within the office action mailed 1/13/2009 as to a "binary change" , "finite dimension", "termination point in space" or "absence of injection structure". Applicant's understanding of the Office position appears to be incorrect.


20. The claim has been read by the Office to require the structure of non-uniform distribution of orifices; and these orifices are of any one choice of 1)non-uniform spacing (i.e. different density), 2)non-uniform sizing (different opening areas), or 3) non-uniform orientation (pointed in different directions).

21. Furthermore, regarding to the clauses "office distributions are configured to deliver at least one of a prescribed (non-uniform ) [directional] distribution of [fluid]" , the claim has been read to only require the ability of the "orifices" to operate to deliver fluid in that manner. As discussed above, the flow direction and distribution would be effected by the previously claimed feature of any one of; 1) non-uniform orifice spacing (i.e. different density), 2)non-uniform sizing (different opening areas), or 3) non-uniform orientation (pointed in different directions), and also dependent upon operating conditions of the two fluids used in the device.

22. Applicant on top of page 17, discusses the requirement of "regions". Applicant is respectfully reminded that this limitation is in a clause which is selective of "one of:". If at least "one of" the clauses is met by the prior art, then it anticipates the claims. In this

instance, the reference does show a "distribution of orifices spatial locations is non-uniform". If Woilees were uniform then the number of jets near the bottom half would be the same as the top half.

23. Applicant apparently agrees with such an understanding of the prior art to

 Woilees similarly provides a second binary (more/less numerous) configuration of additional opposed jets (20, 22) "the said spray nozzles (20, 22) are more numerous in the said enriched zone, in order that the maximum distance from one point of the said spray surface to the closest spray jet will be reduced within this zone and the energy dissipated by these jets per unit of volume will be greater there". Thus, in Fig. 2, Woilees shows two extra pairs of jets 20-22 in the lower half of the cross section, i.e., six sets in the lower half vs. four sets in the upper half. Similarly in Fig. 1, Woilees shows an extra set of opposed jets 20-22 near the bottom half as opposed to the top half of the ping. Woilees similarly provides an axial binary change with orifices 26 being upstream of the pairs of opposed 20-22 orifices in tubes 10 and 12, or the orifices 24 in tube 12.

Woilees

24. However, it also shows at least four "regions" in the manner required by the claim as seen in the markup figure.

25. On the bottom of page 17, applicant cites a quotation of EP 0060634, however this reference is not utilized in the rejection made in the Office action. Issues to EP '634 is not pertinent to the instant rejections made.

26. Regarding applicants discussion of distinctions to "binary distinction", "binary configuration" "binary changes", In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., alleged differences in "binary" features) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In this case, the instant specification

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does not define the word "binary" in determining a meaning to be construed within the context of the art, moreover fails use the term "binary" in the specification. It is not understood what feature is being presented/argued by the phrases.

27. In middle of page 18, Applicant also alleges that the Woilles reference is directed to a "uniformity of size, orientation and particularly *fluid distribution (emphasis added)*".

Such an allegation is not well taken. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. And does not point to any supporting evidence to a page and line number within the prior art to support of the characterization of the teachings of the prior art.

28. Applicant alleges that on pages 19-20 that there is no reason to modify to obtain the combination of references of the prior art. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the reasoning to combine has been pointed out in the office action. There is no persuasive argument as to rebut the reasons of the combination



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found obvious as outlined by the office action above and made in the previous office action.

### ***Conclusion***

29. The prior art made of record *previously* cited and not relied upon is considered pertinent to applicant's disclosure. The following disclose delivery duct which have orifices which are configured to provide a desired introduction of fluid: Jacobsen et al 6478778, and Ayoub et al 5518700 discloses elongated fluid contactors with a non-uniform special/orientation distribution of the orifices.

30. Applicant has amended language to claim 56 and NEW claim 100, which was not previously presented for consideration upon its merits.

31. Applicant's amendment necessitated the new ground(s) and/or additional issues of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G. Soohoo whose telephone number is (571) 272 1147. The examiner can normally be reached on 8AM-5PM, Tues-Fri.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/  
Primary Examiner, Art Unit 1797

Tony G Soohoo  
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Art Unit 1797